

Application No.: 10/035,056

Docket No.: JCLA842S

REMARKSPresent Status of the Application

The Advisory Action mailed July 11, 2003 considered that the arguments against the Previous Office Action are not convincing, and claims 1-10 remain pending. Specifically, claims 1, 3, 7-8 and 10 were rejected under 35 U.S.C. 103(a) as being unpatentable over Bohaty (US 6,264,858); claim 2 over Bohaty and Takenaka (US 5,602,079); claims 4-6 over Bohaty and Hed (US 5,300,487); and claim 9 over Bohaty, Hed and Wang (US 6,106,948). In response thereto, Applicants have amended claims 1-4 and 7. Reconsideration of claims 1-10 is respectfully requested.

Discussions of the Preliminary Amendments

Applicants have amended the "bismuth film" in original claims 1-4 and 7 as the "metallic bismuth film" in the amended ones to distinguish it from Bohaty's non-metallic bismuth borate crystal.

Applicants have also discarded the open terminology "INCLUDING" in the original claim 1 to limit the nonlinear properties of the claimed bismuth film to nonlinear refraction and non-linear absorption *only*.

The metallic bismuth film is *not a new matter* since a bismuth film is *inherently* a metallic bismuth film, while the word "metallic" is added merely to clearly distinguish this invention from the prior art. As generally recognized in the art, *a bismuth film is composed of bismuth element only, and elementary bismuth is surely metallic*. Accordingly, a bismuth film is equivalent to a metallic bismuth film. The metallic bismuth film is also supported by the contents in paragraph [0011] of the specification, since only a bismuth target of 99.9997% purity is used as a deposition source of the bismuth film in the pulsed laser deposition process, and the high-purity bismuth film deposited is surely metallic. That is, the bismuth film of this invention is a metallic bismuth film.

Discussion of Rejections under 35 U.S.C. 103(a)

Claims 1-10 were rejected under 35 U.S.C. 103(a), wherein claims 1, 3, 7-8 and 10 were

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rejected based on Bohaty only, and the other claims were rejected based on the combinations of Bohaty and the other three cited Patents.

Applicants have argued in the Previous Office Action (Paper No. 6) that *Bohaty's bismuth borate crystal is not a metallic bismuth film*. Applicants have also argued that Bohaty does not teach or suggest that bismuth borate crystals can have non-linear refraction effect and non-linear absorption effect (the Kerr effect), and it is therefore non-obvious for one skilled in the art to figure out the use of a metallic bismuth film for producing non-linear refraction effect and non-linear absorption effect as starting from the use of bismuth borate crystals in Bohaty.

For at least the reasons mentioned above, Applicants respectfully submit that the amended independent claim 1 and claims 3, 7-8 and 10 dependent therefrom patently define over the prior art.

Furthermore, the feature of using a metallic bismuth film as a non-linear optical (Kerr effect) material is not disclosed in any one of the other three cited Patents, Takenaka, Hed and Wang. Therefore, Applicants respectfully submit that claims 2, 4-6 and 9 dependent from claim 1 also patently define over the prior art.

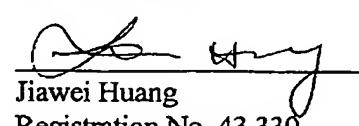
CONCLUSION

For at least the forgoing reasons, it is believed that all pending claims 1-10 are in proper condition for allowance. If Examiner believes that a telephone conference would expedite the examination of the above-identified patent application, Examiner is invited to call the undersigned.

Respectfully submitted,
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IN THE CLAIMS

1. (Currently Amended) A non-linear optical material comprising a metallic bismuth film capable of producing ~~non-linear optical effects including~~ non-linear refraction and non-linear absorption.
2. (Currently Amended) The non-linear optical material of claim 1, wherein the metallic bismuth film is formed by pulsed laser deposition.
3. (Currently Amended) The non-linear optical material of claim 1, wherein a thickness of the metallic bismuth film is approximately 10.5nm.
4. (Currently Amended) The non-linear optical material of claim 1, wherein the metallic bismuth film is covered by a top protective layer.
5. (Original) The non-linear optical material of claim 4, wherein the top protective layer is transparent.
6. (Original) The non-linear optical material of claim 4, wherein the top protective layer comprises Al_2O_3 .
7. (Currently Amended) The non-linear optical material of claim 1, wherein the metallic bismuth film is disposed on a base layer.
8. (Original) The non-linear optical material of claim 7, wherein the base layer comprises glass.
9. (Original) The non-linear optical material of claim 7, wherein the base layer comprises quartz.
10. (Original) The non-linear optical material of claim 1, which is used as a non-linear optical device in an optical method or in an optical apparatus.